THE MOST POWERFUL & PRODUCTIVE 3D SOFTWARE FOR CHARACTER ANIMATION & VISUAL EFFECTS

TOOLS FOR 3D MINDS

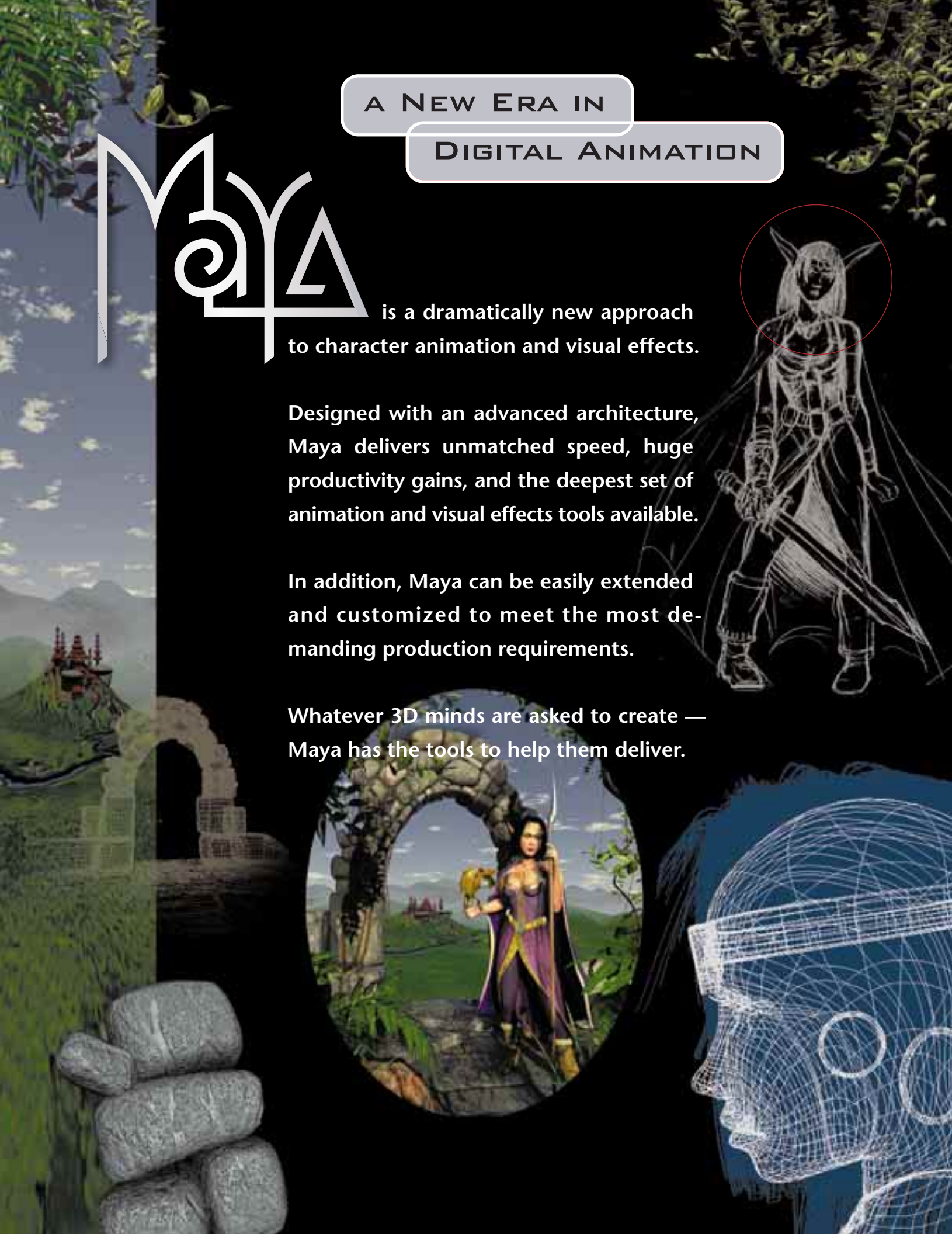
A New Era in Digital Animation

Maya is a dramatically new approach to character animation and visual effects.

Designed with an advanced architecture, Maya delivers unmatched speed, huge productivity gains, and the deepest set of animation and visual effects tools available.

In addition, Maya can be easily extended and customized to meet the most demanding production requirements.

Whatever 3D minds are asked to create — Maya has the tools to help them deliver.



Ultra-Real Character Animation

MAYA™ DELIVERS an intuitive environment where characters truly come to life. Where models are built and move seamlessly when animated. A place where users can add embedded behaviors and high-level controls into each digital creation. A world where the only process the animator has to worry about – is the creative process.

With Maya, animators impart finely tuned expressions and characters with the same ease as directing live actors.

The higher-level 3D character animation features include:

- Deformers that are stackable, reorderable, and animatable.
- A suite of IK (Inverse Kinematics) tools for precise control over character movement.
- Facial animation control from a number of Blend Shapes.
- A complete set of skinning tools.
- Fine-tuned expression control over any attribute of a character.
- Built-in motion capture support.
- Integrated sound synchronization.
- Stitched surfaces on objects remain continuous during complex animated deformations.

Imagine the possibilities: Build a character, move the legs, and the upper body intuitively follows. Move the arms and the appropriate muscles bulge and retract. Use the built-in tools, or create a customized panel of slider controls to lip-sync facial expressions to a sound-track. With Maya, the age of 3D digital puppets has arrived.

ultraReal

Explosive Visual Effects

WATER falling gently over a water wheel… A wrecking ball hitting a brick wall…The stellar brilliance of two galaxies colliding…

Maya provides a vast arsenal of tools for creating effects so dazzling, only real is more real. Animators can easily set up model or particle relationships that accurately simulate such real-world forces as friction, gravity, and wind; for results that once took hours of keyframing to achieve. Artists can set the mood of a scene with interactive lighting controls, to quickly experiment with position, color, fall off and light intensity.

Maya's complement of integrated rendering tools allow animators to render their 3D digital effects into film quality with arbitrarily complex shader networks that can be graphically linked to any object or scene parameter.

The Most Advanced Workflow

MAYA'S user interface is designed for productivity. It's intuitive. Accessible. Yet it has the versatility and high-end controls advanced users need to maximize throughput.

Now animators can work on a full-screen without being crowded in by menus and icons. Maya's user interface can be easily set up to display only those tools required for the job. Assign hotkeys, add commands to the Shelf or bring up the Hotbox Menu of available commands without breaking the creative focus.

Users can write simple scripts in MEL (Maya Embedded Language) to automate repetitive tasks, or design an environment custom-made for a specific project. Animators can freely undo and redo their work. Directly adjust scene components using state-of-the-art 3D manipulators. And leverage Maya's underlying node-based architecture with a drag and drop graphic user interface that invites and rewards experimentation.

Explosive

IMAGE CREDITS:

Inside from top left:
Bingo. C. Landreth; C. Ford; Square; Bingo. C. Landreth; C. Ford

Overleaf: G. Mundell, P. Roy and M. Kitchen

Ruby's Saloon:
K. Lombardi, C. Gossett, J. Schleifer, C. Ford and M. Kitchen

The Flexibility to Customize

IMAGINE setting up a customized control panel for a character's head, including such fine-tuned behaviors as skin wrinkles, phonemes, eyebrow movement, and blinking. The resulting sliders can be used to visually mix, match, and blend facial expressions to a spoken sound track! That's just part of the power of MEL.

MEL is a unique, complete, fully integrated scripting language that provides customized control over Maya. With MEL, users can extend Maya to meet specific production needs including creating behaviors and controls for specific characters, advanced dynamic effects, and proceedural modeling and animation. Plus, MEL lets the user create a tailored user interface based upon individual working styles and the needs of each production.

Maya's C++ API design lets technical directors add custom plug-ins tailored to specific production requirements. External hardware that drives animatable attributes can be plugged into Maya without entering a special mode. External controls are easily remapped using buttons on the shelf.

The Power to Get You There

MAYA is built for speed.

Its object oriented design and OpenGL™ graphic implementation provides superior playback speed and quality, even on modest systems. And animators can choose to work in shaded, lit, or textured modes.

Navigation and playback speed can easily be improved by utilizing a range of options that reduce the computational and display complexity of scene data. With advanced features, including file referencing, Maya is ready to handle the large data requirements that major productions of the future will demand.

MAYA ADVANCED MODULES

MAYA ARTISAN

Maya Artisan™ provides animators with the creative control and intuitiveness of traditional artist brushes and sculpting tools for modifying objects, selecting CVs, and assigning cluster weights. With Artisan, animators can even "paint on" soft body goal weights or particle emitters on a NURBS surface. Also included is a shelf of MEL scripts that demonstrate how to create customized results.

MAYA F/X

Mist rising from a lamp to form a Genie . . . Footprints forming in mud . . . Infernos . . . Jet engine exhaust . . . it used to be an arduous task to get effects like these to look and behave naturally. Not anymore. With Maya F/X™, animators can easily create flexible, soft body objects and complex particle systems that adhere to real-world physics. And seamlessly interact with other objects in the scene.

MAYA POWERMODELER

The perfect complement to Maya's character modeling tools, Maya PowerModeler™ gives animators the precision they need to create real-world mechanical designs where adherence to specific values, such as the radius of a rounded corner, are critical.

WELCOME TO RUBY'S SALOON

THE SCENE IS SET with a long shot of Ruby's from the street outside. The camera then zooms in through the swinging doors to indicate that Mel has arrived.

The saloon model is detailed with individual boards to generate complex shadowing. Maya's hardware texturing and lighting capabilities allow quick placement and control of scene lights – both interior and exterior. High quality depth-mapped shadows and glow lights generate quickly, and give the final rendered scene a rich, warm look.

MEL STRUTS across the bar and looks around to see what Ruby's has to offer.

Maya is designed to give you straightforward control of complex characters. Maya's Graph Editor (*above, lower right*) presents the animator with selected curves for editing. The HyperGraph (*upper right*) allows display, selection and editing of hierarchical relationships and node types in either structured or free-form layouts.

CUT TO A CLOSE UP of Mel's face as he inquires, "How's a thirsty cowboy get a drink?" in Ruby's Saloon.

This facial animation sequence makes use of Maya's Dope Sheet (*lower right*) and integrated sound sync. In this example, a custom control panel has been built (*left*), using the MEL scripting language, to give easy access to phoneme facial poses with other expressions. Similar function-ality is available, without scripting, in Maya's Blend Shape Editor.

Ruby's Saloon is an Alias|Wavefront in-house production that has put MAYA through the same demanding paces found at cutting edge design studios worldwide.

A Closer Look at MEL

Wireframe and Shaded Display

Maya lets you view your model in Wireframe, X-ray, or Shaded/Lit Mode. You have control over the quality of the previewed surfaces and you can interactively view surface textures and actual lighting on shaded areas.

Selection Handles

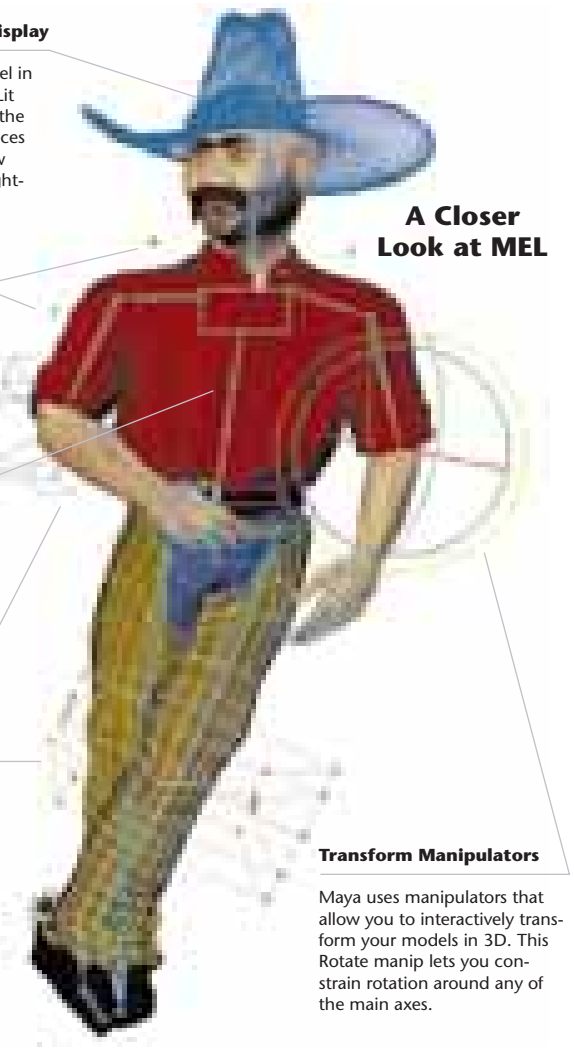
Selection Handles give you quick access to any part of your character's hierarchy that needs to be animated.

Kinematics

Maya lets you set up and attach your surfaces to skeleton joints, then use IK handles, expressions and constraints to control your character's movement.

Flexors

Folding or tucking clothing, muscle bulging and other surface deformations can be easily accomplished using flexors. Flexors can be set as either lattices, sculpt objects or clusters to generate quality surface motion resulting from joint bending.

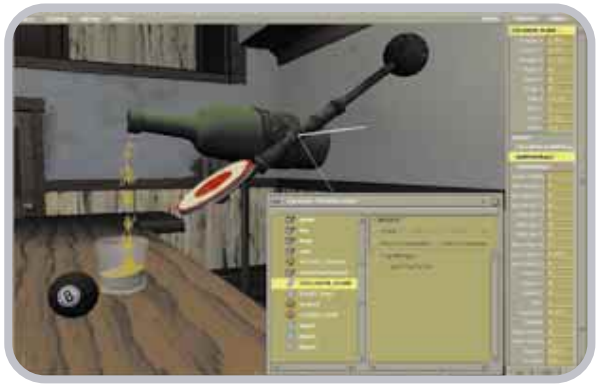


Transform Manipulators

Maya uses manipulators that allow you to interactively transform your models in 3D. This Rotate manip lets you constrain rotation around any of the main axes.

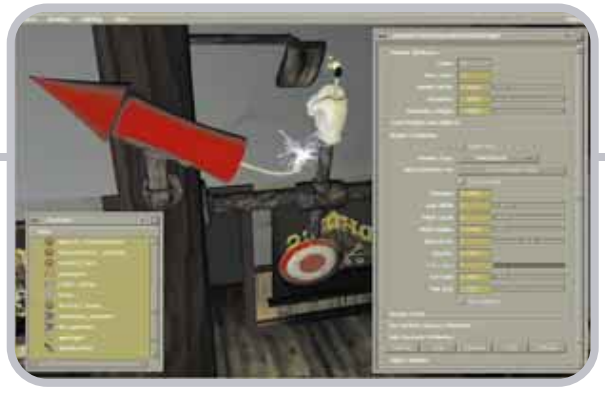
THE BARTENDER at Ruby's is a Dodo bird that lives up in the saloon rafters. The rocket yanks open the door of the Dodo's cage and he pedals his unicycle across a procedurally generated tightrope and digs into a pile of bird seed. This causes a teeter-totter to tip and drop an eight-ball towards the bar.

The Dodo's facial expressions, as well as head and wing movements, are keyed using Maya's Channel Box (*above, right*). Motion for the unicycle is defined in the Expression Editor (*lower left*). We created an expression that looks backwards in time to produce the delay and follow-through motion characteristic of a balancing unicycle. The Dodo rides the unicycle automatically as constraints are used to attach his feet to the pedals and his backside to the seat.



THE DODO's eight-ball drops onto an automated drink dispenser that pours Mel a generous shot of whiskey.

Rigid body dynamics and hinge constraints are used to quickly produce an accurate tipping motion. Particles emitted from the bottle at a prescribed tip angle fall into the tumbler. Their collision with the tumbler triggers a particle collision event which drives an expression that causes the glass to fill via Blend Shape. The various dependencies are established in Maya's Dynamic Relationship Editor.



MEL SPIES this bull's eye and rocket device in the rafters of Ruby's. He turns and shoots. Hitting the target causes the arm to swing, match to light, fuse to burn, and rocket to launch.

Motion for the match, arm and target device is all calculated using rigid body dynamics. Squash and stretch on the rocket and launch ramp are accomplished using Blend Shape. Particle appearance and behavior are controlled via the particle object's Attribute Editor which can be edited while the scene plays back.

This summary highlights particular features of Maya, Maya F/X and Maya Artisan. Please consult the Maya F/X and Maya Artisan brochures for more detail on what is included in those advanced modules.

TECHNICAL FACTS & FEATURES

ARCHITECTURE

Maya's node-based architecture provides unparalleled performance and total control.

Animatable Construction History
- Construction history is fully editable and animatable with changes automatically propagated downstream to dependent objects.

Virtually Everything is Animatable
- Maya provides tremendous flexibility and power for animating virtually any node's attribute in the scene. Or add your own attributes.

Integrated Scripting Language (MEL)
- Lets you extend Maya to add embedded behaviors/controls into characters, produce advanced dynamic effects and perform proceedural modeling and animation.

File Referencing for Scene Components
- Re-use referenced files in single or multiple scenes.
- Multiple artists can work on the same scene/project with proper data segmentation.
- Allows TD's to do low resolution data substitution

Data Import

mayaAscii, mayaBinary, mel, DXF, explore-Geo, .OBJ, IGES, aliasWire, aiff, image, .mov (ascii motion)

Data Export

GEOMETRY: aliasWire, IGES, DXF, OBJ, mayaAscii, mayaBinary, mel, mov
IMAGE: GIF, Softimage, Wavefront RLA, TIFF, SGI RGB, Alias PIX, Maya IFF, JPEG, EPS, Cineon, Quantel

System Requirements

HARDWARE:
SGI R4000
or higher processor
24-bit graphics
OpenGL native preferred.

RAM:
minimum 128M

SOFTWARE:
IRIX 6.2 or higher

GENERAL ANIMATION

Maya includes a complete set of tools for keyframe and procedural animation.

Path Animation
- Easily animate an object along a curve or surface.
- Edit path or other animation parameters during playback.

Set Driven Key
- Quickly and easily establish relationships where one action automatically drives another.

Graph Editor
- Powerful, precise control over how any animated parameter changes over time.

Dope Sheet
- Rapid and intuitive global editing of keyframe timing.

Channel Box
- Quickly edit a selected object's attributes, one or more fields at a time.

Generalized Constraints
- Comprehensive assortment of constraints including point, aim, orient, scale, geometry, normal, tangent, pole vector.

Powerful Expressions
- Attributes can be controlled using multi-line, complex expressions with Maya's integrated scripting language.

Blend Channels
- Using MEL, mix multiple animation channels into a single result
- Use a simpler curve to control a dense curve generated from motion capture or simulation data.

Procedural Animation
- Create complex animation using MEL procedures rather than traditional keyframing.

CHARACTER ANIMATION

Maya offers deep functionality for creating and animating digital characters.

Layered Deformations
- A comprehensive range of deformation alternatives is available, giving animators extensive control over animation while simplifying setup.
- Includes Lattices, Sculpt Objects, Clusters, Point on Curve Contraints, Blend Shapes, Wires, Wrinkle Tool, Bind/Detach Skin, Flow.
- Deformations work on NURBS and polygons.
- Deformations may be layered and reordered.

Overlapping Flexors
- Easily drive deformations by transformations of one or more joints
- Ideal for animating muscles, skin, and clothing.

Integrated Sound Synchronization
- Great for facial animation/ lip synchronization or any other animation requiring precise sync to soundtrack

Skeletons and Inverse Kinematics (IK)
- Three built-in IK solvers reduce time to create high quality character animation. (joint limits, stiffness, damping, preferred angles etc.)

IK Spline
- Easily animate skeletal chains such as a character's spine or tail.

Integrated Motion Capture
- Input animation data directly from live performances.

DYNAMICS

Supports complex dynamic interaction including collisions between rigid bodies, soft bodies, and particles.

Rigid Body Dynamics
- Realistic high speed simulation of rigid objects including hinge, nail, spring, barriers, and pin constraints.
- Keyframe control over whether rigid body objects are on/off provides unprecedented control.

Fields
- Apply fields like gravity, vortex, radial and turbulence to rigid-body objects, soft-body objects and particle systems.
- Expression-based animation of all field attributes.

Soft Body Dynamics*
- Accurate and rapid simulation of flexible objects such as flags, capes, melting geometry. Integration with the animation system allows for creation of secondary effects like muscle jiggle, floppy hats.

Extensible Integrated Particle System*
- Powerful integrated particle system with expression-based and keyframe control over particle attributes, motion and dynamics.
- Users can create precise [per particle] controls to meet specific production needs using scripting language to create libraries of effects.

Goal Force Dynamics for Particle and Soft Bodies*
- Fast and intuitive controls for complex shape production and goal-directed particle behaviors.

Artisan for Assigning Dynamics Properties
- Use Artisan natural brush interface to quickly and easily assign dynamics properties such as goal weights.

*requires Maya F/X

MODELING

A full complement of NURBS and polygon modeling tools with an emphasis on seamless character construction.

Modeling Productivity
- Modeling productivity is unmatched through a combination of performance and workflow. Examples include 3D manipulators, unlimited undo, the ability to work in single perspective shaded mode and quickly change views, and automation of frequent or repetitive tasks using macros.
- High level of interactivity even when modeling very large files.

Spline Modeling Tools
- Based on Alias|Wavefront's Academy Award™ winning NURBS technology, Maya provides a powerful general set of modeling tools, curve, curve-on-surface, and surface modeling tools.

Polygon Tools
- Extensive set of tools focused on detailed creation, editing and texturing of polygonal models down to the face, edge and vertex level.

Deformation Tools
- Use lattices, sculpt objects, wires and other deformers for modeling characters and other freeform shapes.

Stitch Surfaces
- Stitch adjacent surfaces together and keep them continuous during animation.

Procedural Modeling
- Create complex objects/ scenes using scripts as an alternative to GUI-based tools.

Artisan Modeling and Character Building Tools
- Use Maya Artisan's natural brush interface to interactively sculpt, paint CVs, and add objects to surfaces.

RENDERING

Maya delivers film quality rendered images of stunning clarity and realism.

Selective Ray-Tracing
- Selective ray-tracing provides an efficient, yet accurate, solution for sharp shadows, light reflection and refraction.

Hardware Particle Rendering*
- New generation of high speed production-quality particle effects rendering with display mode controls such as texturing, line smoothing, multi-pass rendering and motion blur.

Software Particle Rendering*
- High quality software particle rendering with comprehensive assortment of effects (including blobby rendering) for clouds, smoke, fire, etc.

Digital OptiF/X
- Add realistic glows, lens flare and atmospheric effects as part of the rendering process.

Motion Blur
- High quality 3D motion blur heightens realism of moving objects and scenes.

Intelligent Memory Management
- Tile-based rendering architecture reduces time-consuming swapping

Shader Networks
- Create complex or unique rendering effects by connecting rendering attributes to static or dynamic properties within the scene.

Programmable Shaders
- Use the OpenMaya API to create your own plug-in shaders for unique effects.

RIB Out
- Alternatively create RIB files for use with RenderMan® software.

UNITED STATES FIELD OFFICES

ATLANTA	Tel: 770.393.1881	Fax: 770.393.2705
BOSTON	Tel: 617.270.0606	Fax: 617.270.0608
CHICAGO	Tel: 847.397.5280	Fax: 847.397.6067
DALLAS	Tel: 972.789.2950	Fax: 972.789.2951
DAYTON	Tel: 937.258.7441	Fax: 937.258.7449
DETROIT	Tel: 248.737.3500	Fax: 248.737.3506
HOUSTON	Tel: 713.780.9292	Fax: 713.780.9296
LOS ANGELES	Tel: 310.914.1566	Fax: 310.914.1580
MINNEAPOLIS	Tel: 612.339.5820	Fax: 612.339.5939
NEW YORK	Tel: 212.268.4900	Fax: 212.563.9418
SAN FRANCISCO	Tel: 415.596.7000	Fax: 415.596.7002
SEATTLE	Tel: 206.287.5600	Fax: 206.667.9049
WASHINGTON	Tel: 703.631.4800	Fax: 703.227.8595

INTERNATIONAL FIELD OFFICES

AUSTRALIA	Tel: 61.2.9956.3819	Fax: 61.2.9437.6574
BELGIUM	Tel: 32.9.266.1212	Fax: 32.9.266.1210
FRANCE	Tel: 33.1.44.92.81.60	Fax: 33.1.44.92.81.61
GERMANY	Tel: 49.89.31.70.20	Fax: 49.89.31.70.2199
HONG KONG	Tel: 852.2519.4412	Fax: 852.2827.4227
ITALY	Tel: 39.39.605.8272	Fax: 39.39.605.8281
JAPAN	Tel: 81.3.3470.8282	Fax: 81.3.3470.8288
LATIN AMERICA	Tel: 1.305.919.8200	Fax: 1.305.919.8300
MALAYSIA	Tel: 60.3.209.4703	Fax: 60.3.209.4705
SINGAPORE	Tel: 65.435.0458	Fax: 65.536.8502
UNITED KINGDOM	Tel: 44.1494.441.273	Fax: 44.1494.449.289

GLOBAL HEADQUARTERS

210 King Street East
Toronto Ontario Canada M5A 1J7

TOLL FREE:	800.447.2542
TEL:	416.362.9181
FAX:	416.369.6140
E-MAIL:	info@aw.sgi.com
WEB:	www.aw.sgi.com

Alias | wavefront
A SiliconGraphics Company

© 1998 Alias|Wavefront, a division of Silicon Graphics Limited, all rights reserved. Alias|Wavefront, Maya, the Maya logo, Tools For 3D Minds, Maya Artisan, Maya F/X, Maya PowerModeler and OpenGL are trademarks of Alias|Wavefront, a division of Silicon Graphics Limited. Silicon Graphics is a registered trademark of Silicon Graphics, Inc. RenderMan is a registered trademark of Pixar. All other trademarks mentioned herein belong to their respective owners.